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Effects of artificial rearing and restricted nutrient intake during the first three weeks of life on later performance and carcass characteristics of pigs

G L. Allee

M Noll

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Abstract

Sixty pigs from nine 1itters were allotted, 24 hours after birth, by litter, sex, and birth weight to three treatments: A) sow reared, B) artificially reared and fed milk replacer ad libitum twice daily (artificially reared-unrestricted), and C) artificially reared and restricted to 50% of the nutrient intake of treatment B (artificially reared-restricted). Artificially reared pigs were housed in individual cages during the 20 day treatment period. After 21 days of age, pigs were fed corn-soybean meal diets ad libitum to slaughter at 220 pounds. Average daily gains and pig weights at 21 days differed significantly (P<.0l) different among all treatments.; Swine Day, Manhattan, KS, November 13, 1980

Keywords

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Effects of Artificial Rearing and Restricted Nutrient Intake During the First Three Weeks of Life on Later Performance and Carcass Characteristics of Pigs

Gary L. Allee and Mark Noll

Summary

Sixty pigs from nine litters were allotted, 24 hours after birth, by litter, sex, and birth weight to three treatments: A) sow reared, B) artificially reared and fed milk replacer ad libitum twice daily (artificially reared-unrestricted), and C) artificially reared and restricted to 50% of the nutrient intake of treatment B (artificially reared-restricted). Artificially reared pigs were housed in individual cages during the 20 day treatment period. After 21 days of age, pigs were fed corn-soybean meal diets ad libitum to slaughter at 220 pounds. Average daily gains and pig weights at 21 days differed significantly ($P<.01$) different among all treatments. Sow reared pigs gained .45 lb/day and weighed 12.1 lb at 21 days; artificially reared-unrestricted pigs gained .31 lb/day and weighed 9.3 lb at 21 days; and artificially reared-restricted pigs gained .16 lb/day and weighed 6.4 lb at 21 days. Sow reared pigs and those artificially reared-unrestricted had similar average daily gains, during the starter and grower periods and required 10 days longer to reach market weight. These results indicate that a 50% reduction in nutrient intake the first three weeks of life will increase days required to reach market weight. Artificially reared pigs fed all they will consume twice daily will reach market weight at the same age as sow-reared pigs weaned at 21 days of age.

Introduction

We reported at Swine Day 1979 that pigs can be successfully reared artificially with minimum cost in time and equipment. The present study was conducted to evaluate the effects of artificial rearing on later performance and carcass composition and how a marked reduction in early gain affected later growth and development.

Procedures

Sixty pigs from nine litters were allotted by litter, sex, and birth weight to three treatments: A) sow reared, B) artificially reared and fed milk replacer ad libitum (artificially reared unrestricted), and C) artificially reared and restricted to 50% of the nutrient intake of treatment B (artificially reared-restricted).

Artificially reared pigs were housed in individual cages in a small environmentally controlled room and fed four times a day on day 1, three times a day on day 2, then twice daily through day 21. All artificially reared pigs were given 125 ml of cow colostrum daily for the first three days after removal from the sow. Artificially reared restricted pigs got only 50% of the nutrient intake of treatment B pigs. At 21 days of age, all pigs were moved to a conventional nursery and fed ad libitum a corn-soybean diet with 10% whey formulated to contain 1.2% lysine until they weigh 25 pounds. From 25 to 50 pounds, all were fed a corn-soybean meal diet formulated to contain 1.0% lysine; from 50 to 125 pounds, a corn-soybean diet containing .75% lysine; from 125 pounds to slaughter at 220 pounds, a corn-soybean meal diet containing .57% lysine. Fifteen pigs per treatment were slaughtered at 220 pounds to obtain carcass data.

Results and Discussion

Pig performance and survival rates during the first 21 days are shown in Table 20. Sow reared pigs gained faster and weighed more at 21 days than pigs reared artificially ($P<.01$). In earlier studies (Swine Day 1979) artificially reared and sow-reared pigs had similar 21 day weights. In this study, we were not able to maintain a constant (8 pigs) nursing each sow and sow reared pigs probably got more milk than normally. Only one of 40 of artificially reared pigs died during the 3-week trial (97.5% survival); 4 of 20 that nursed sows died (80% survival). As expected, pigs artificially reared and restricted to 50% of the nutrient intake of artificially reared unrestricted pigs gained only half as much during the restricted diet period.

Table 20. Pig Performance (Days 1-21).

	Treatments		
	Artificially reared		Sow
	Unrestricted	Restricted	reared
No. of pigs	20	20	20
Initial wt., lb	3.13	3.14	3.13
Pig wt. (21 days) lb	9.3	6.4	12.1
Daily gain, lb	.31	.16	.45
No. of pigs that died	0	1	4

During the starter phase (days 21-56), sow-reared pigs gained slightly faster than the artificially reared unrestricted pigs and significantly ($P<.01$) faster than artificially reared restricted pigs (Table 21). Feed conversion was similar for all three groups.

Table 21. Effect or Method of Rearing and Restricted Nutrient Intake on Subsequent Performance[a]

	Treatments		
	Artificially Reared		Sow reared
	Unrestricted	Restricted	
Starter phase (21-56 days)			
Daily gain, lb	.63	.57	.70
Feed gain	1.83	1.74	1.76
Grower phase (56 days-125 lbs)			
Daily gain, lb	1.69	1.47	1.82
Feed gain	2.46	2.56	2.63
Finisher phase (125-220 lb)			
Daily gain, lb	2.17	2.10	1.96
Feed gain	3.46	3.66	3.68
Combined Grower & Finisher (56 days to 220 lb)			
Daily gain, lb	1.89	1.79	1.89
Feed gain	3.03	3.18	3.16
Age at 220 lb, days	160	170	160

[a]Each value represents the mean of 5 pens of 3 pigs each.

During the grower phase (56 days to 125 lb) sow-reared pigs and those artificially reared unrestricted had similar rates of gain (Table 21). Artificially reared restricted pigs gained significantly ($P<.01$) slower than pigs in the other two treatments. Feed conversion was similar for all three groups.

During the finishing phase, artificially reared pigs gained faster than sow reared pigs (Table 21). Feed conversion was similar for all three groups. Performances from 56 days to slaughter are shown in Table 21. During that period artificially reared unrestricted pigs and sow reared pigs gained at the same rate (1.89 lb/day) and reached slaughter weight at 160 days of age. But artificially reared restricted pigs gained 1.79 lb/day and reached slaughter weight at 170 days of age.

Carcass characteristics as influenced by method of rearing and restricted nutrient intake during the first three weeks of life are shown in Table 22. Sow-reared pigs and pigs artificially reared unrestricted had similar carcass measurements. Restricting the nutrient intake by 50% the first three weeks of life tended to increase backfat thickness, but had no effect on carcass length or loin-eye area.

These results demonstrate that pigs can be removed from sows at one day of age and artificially reared with excellent survival rates. Artificially reared pigs fed all they will consume twice a day from days 3 to 21 will weigh 9 to 10.5 pounds when 21 days old. And latter growth rate and feed conversion of artificially reared pigs are similar to sow-reared pigs.

Restricting the nutrient intake early in life reduced rate of gain during the later periods and required 10 days longer to reach market weight.

Table 22. Effect of Method of Rearing and Restricted Nutrient Intake Early in Life on Carcass Characteristics[a]

	Treatments		
	Artificially Reared		Sow reared
	Unrestricted	Restricted	
Backfat, thickness, in	1.28	1.40	1.20
Loin-eye area, in^2	4.15	4.10	4.39
Length, in	31.88	32.11	32.33

[a]Each value is the mean of 15 observations.